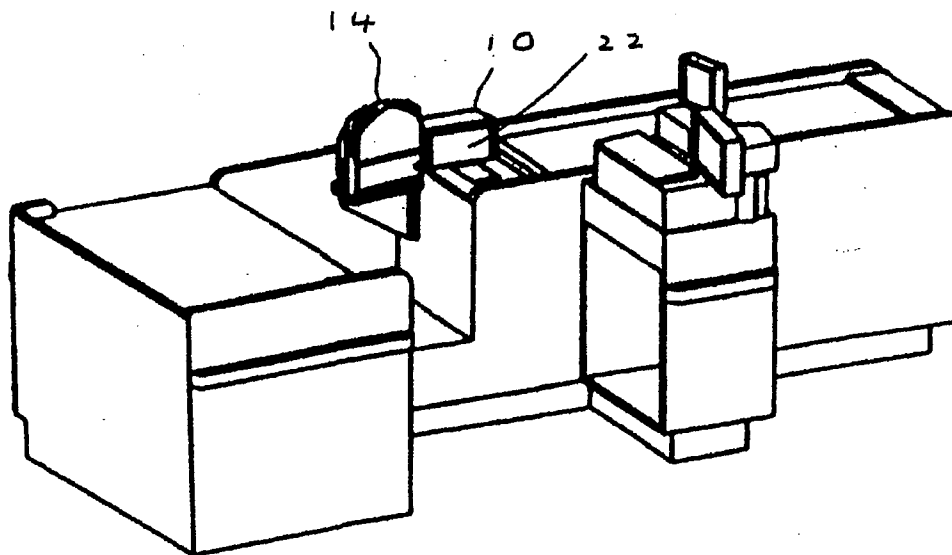




## INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification <sup>7</sup> : G08B 13/24	A2	(11) International Publication Number: <b>WO 00/26880</b> (43) International Publication Date: 11 May 2000 (11.05.00)
<p>(21) International Application Number: PCT/ZA99/00114</p> <p>(22) International Filing Date: 28 October 1999 (28.10.99)</p> <p>(30) Priority Data: 98/9918 30 October 1998 (30.10.98) ZA</p> <p>(71)(72) Applicant and Inventor: MARTIN, Alfred, Henry [ZA/ZA]; A12 Edgemoor Business Park, 7741 Edgemoor (ZA).</p> <p>(74) Agent: BACON, Brian; Brian Bacon &amp; Associates, 2nd floor, Mariendahl House, Norwich on Main, Main Road, 7700 Newlands (ZA).</p>	<p>(81) Designated States: AE, AL, AM, AT, AU, AZ, BA, BB, BG, BR, BY, CA, CH, CN, CR, CU, CZ, DE, DK, DM, EE, ES, FI, GB, GD, GE, GH, GM, HR, HU, ID, IL, IN, IS, JP, KE, KG, KP, KR, KZ, LC, LK, LR, LS, LT, LU, LV, MA, MD, MG, MK, MN, MW, MX, NO, NZ, PL, PT, RO, RU, SD, SE, SG, SI, SK, SL, TJ, TM, TR, TT, TZ, UA, UG, US, UZ, VN, YU, ZA, ZW, ARIPO patent (GH, GM, KE, LS, MW, SD, SL, SZ, TZ, UG, ZW), Eurasian patent (AM, AZ, BY, KG, KZ, MD, RU, TJ, TM), European patent (AT, BE, CH, CY, DE, DK, ES, FI, FR, GB, GR, IE, IT, LU, MC, NL, PT, SE), OAPI patent (BF, BJ, CF, CG, CI, CM, GA, GN, GW, ML, MR, NE, SN, TD, TG).</p> <p><b>Published</b> <i>Without international search report and to be republished upon receipt of that report.</i></p>	

(54) Title: SECURITY SYSTEMS FOR INHIBITING THEFT OF GOODS FROM RETAIL STORES



## (57) Abstract

A checkout system for a retail store is disclosed which comprises a bar code reader (10) and an anti-theft tag deactivator (14). The bar code reader produces a signal upon the bar code on an article being read successfully by the reader. This signal is used to enable the deactivator for a predetermined period of time whereafter the deactivator is disabled until the next successful bar code read. This minimises the prospects of a cashier being able to deactivate the anti-theft tag on an article without having read the bar code on the article and hence entered the sale. The system can also include a microswitch for detecting closing and opening of the cash drawer. If the drawer is left open, but the bar codes on articles are read by the bar code reader, this can indicate the possibility of goods being fraudulently removed from the store.

**FOR THE PURPOSES OF INFORMATION ONLY**

Codes used to identify States party to the PCT on the front pages of pamphlets publishing international applications under the PCT.

AL	Albania	ES	Spain	LS	Lesotho	SI	Slovenia
AM	Armenia	FI	Finland	LT	Lithuania	SK	Slovakia
AT	Austria	FR	France	LU	Luxembourg	SN	Senegal
AU	Australia	GA	Gabon	LV	Latvia	SZ	Swaziland
AZ	Azerbaijan	GB	United Kingdom	MC	Monaco	TD	Chad
BA	Bosnia and Herzegovina	GE	Georgia	MD	Republic of Moldova	TG	Togo
BB	Barbados	GH	Ghana	MG	Madagascar	TJ	Tajikistan
BE	Belgium	GN	Guinea	MK	The former Yugoslav Republic of Macedonia	TM	Turkmenistan
BF	Burkina Faso	GR	Greece			TR	Turkey
BG	Bulgaria	HU	Hungary	ML	Mali	TT	Trinidad and Tobago
BJ	Benin	IE	Ireland	MN	Mongolia	UA	Ukraine
BR	Brazil	IL	Israel	MR	Mauritania	UG	Uganda
BY	Belarus	IS	Iceland	MW	Malawi	US	United States of America
CA	Canada	IT	Italy	MX	Mexico	UZ	Uzbekistan
CF	Central African Republic	JP	Japan	NE	Niger	VN	Viet Nam
CG	Congo	KE	Kenya	NL	Netherlands	YU	Yugoslavia
CH	Switzerland	KG	Kyrgyzstan	NO	Norway	ZW	Zimbabwe
CI	Côte d'Ivoire	KP	Democratic People's Republic of Korea	NZ	New Zealand		
CM	Cameroon			PL	Poland		
CN	China	KR	Republic of Korea	PT	Portugal		
CU	Cuba	KZ	Kazakstan	RO	Romania		
CZ	Czech Republic	LC	Saint Lucia	RU	Russian Federation		
DE	Germany	LI	Liechtenstein	SD	Sudan		
DK	Denmark	LK	Sri Lanka	SE	Sweden		
EE	Estonia	LR	Liberia	SG	Singapore		

-1-

SECURITY SYSTEMS FOR INHIBITING THEFT  
OF GOODS FROM RETAIL STORES

FIELD OF THE INVENTION

5           THIS INVENTION relates to security systems for inhibiting theft of  
goods from retail stores.

BACKGROUND TO THE INVENTION

10           A commercially used system for inhibiting the theft of goods from retail  
stores comprises tagging each article with a tag which, unless deactivated by an  
authorized employee, triggers an alarm at the store exit. The tag is tuned to react to  
signals emitted by security devices located at the exits of the retail store. The  
signals can, for example, be radio frequency signals at 58kHz. Upon being  
subjected to a signal of this frequency, the tag vibrates transmitting a signal to a  
receiver of the adjacent security device whereupon an alarm is activated. To  
deactivate the tag its response frequency is altered using suitable equipment. For  
15           example, the response frequency of the tag can be changed from 58kHz to 60kHz.  
When the article with the deactivated tag attached is taken out of the retail store, the  
tag remains passive as it now requires a signal of 60kHz to activate it. The  
response frequency of the tag can subsequently be changed back to 58kHz thereby  
enabling the tag to be used again. This feature is particularly necessary when  
20           goods, such as video cassettes, are repeatedly rented out but must be protected  
whilst in the store.

-2-

This system can be circumvented when the cashier at the checkout is in collusion with the customer. The simplest way of defeating the system is for the tag on the article to be deactivated but not rung up on the till or "swiped" over the bar code reader. Hence the article does not appear on the customer's till slip but can  
5 still safely be taken out of the store. The present invention seeks to counter this type of theft.

Another problem that retail outlets have is theft of monies paid over by customers to cashiers. One way in which a cashier can steal is, after finalizing a transaction, not to close the cash drawer fully. The next customer's goods are then  
10 "swiped" over the bar code reader, not as a sale but as a price enquiry. This results in an entry on the till slip but nothing on the journal roll. The customer is thus satisfied that the correct amounts have been charged, nothing has been entered on the journal roll and the cashier can keep the cash knowing that there is no imbalance in the records and no cash shortage in the drawer. The present invention  
15 also seeks to make thefts of this type more difficult to perpetrate successfully.

#### BRIEF DESCRIPTION OF THE INVENTION

According to one aspect of the present invention there is provided a checkout system for a retail store, the system including;

a bar code reader which generates a signal each time there is a successful  
20 swipe across the reader, and which signal is used to cause an audible "beep" to be emitted; and

-3-

an anti-theft tag deactivator which is switched into an enabled condition for a predetermined period each time said signal is generated.

According to a further aspect of the present invention there is provided a checkout system for a retail store, the system comprising;

5 a bar code reader including means for generating a signal each time there is a successful swipe across the reader, the reader including means for emitting an audible sound each time said signal is generated;

a control unit;

means for feeding an operating signal to said control unit each time the  
10 successful swipe signal is generated; and

an anti-theft tag deactivator connected to said control unit and having an enabled condition in which it deactivates a tag presented thereto and a disabled condition in which it does not deactivate a tag presented thereto, said unit generating an enable signal which switches said deactivator to its enabled condition  
15 for a predetermined period of time upon an operating signal being fed to the control unit.

Said operating signal can be tapped-off the bar code reader's electronic circuitry or an acoustic pick-up can be used to detect said sound and generate said operating signal. If an acoustic pick-up is used it can be a  
20 microphone attached to the housing of the bar code reader.

-4-

An advantage of using an acoustic pick-up is that it prevents the necessity of tampering with the bar code reader's circuitry. However, the frequency of the acoustic signal used in commercial bar code readers varies which can complicate tuning the acoustic pick-up to the correct frequency.

5                   According to a further aspect of the present invention there is provided a checkout system for a retail outlet, the system comprising a cash drawer and means for producing a first signal indicative of the cash drawer being fully closed, a bar code reader which generates a second signal each time that an article is "swiped" across it and the bar code is read successfully, and means responsive to  
10                   said signals for establishing an alarm condition in the event that a second signal is received in the absence of a first signal.

                  According to another aspect of the present invention there is provided a method of countering theft of an article from a retail store which article carries a tag that, unless deactivated, triggers an anti-theft alarm at a store exit, the method  
15                   comprising swiping the article across a bar code reader to read a bar code carried by the article, using the signal generated by the bar code reader upon a successful swipe to enable a tag deactivator for a predetermined period of time, and disabling said deactivator at the end of said predetermined period of time.

#### BRIEF DESCRIPTION OF THE DRAWINGS

20                   For a better understanding of the present invention, and to show how

-5-

the same may be carried into effect, reference will now be made, by way of example, to the accompanying drawings in which:-

Figure 1 is a pictorial view of a checkout at a retail store;

Figure 2 is a diagrammatic representation of a checkout; and

5           Figure 3 is a block diagram.

#### DETAILED DESCRIPTION OF THE DRAWINGS

Referring firstly to Figures 1 and 2, the checkout illustrated comprises a bar code reader 10 over which articles being checked out are swiped. If the bar code reader 10 fails successfully to read the bar code, which can happen for a number of reasons, the bar code reader 10 remains entirely passive and does not react to the fact that an article has been swiped. The article has to be swiped until there is a successful read. The cashier and customer know that this has happened because the bar code reader 10 generates a signal which is fed to a speaker or piezo electric device 12 and is emitted as an audible beep.

15           Reference numeral 14 designates an anti-theft tag deactivator. The bar code reader 10 and deactivator 14 are placed adjacent one another so that the cashier, in one sweeping motion along the path indicated at P (Figure 2), can move the article across the bar code reader 10 and then bring the tag within the field generated by the deactivator 14.

-6-

A processing unit 16 (which will be described in more detail hereinafter with reference to Figure 3) is connected by a line 18 to an acoustic pick-up 20. The pick-up 20 is attached to the casing 22 of the bar code reader 10 adjacent the speaker or piezo electric device 12 which emits the audible beep. The device 12 and the pick-up 20 are preferably on the rear of the casing 22 of the reader 10.

The unit 16 receives a signal each time an audible beep is "heard" by the pick-up 20. For a period of, for example, two seconds after the signal from the pick-up 20 reaches the unit 16, the unit 16 generates a signal which is fed along a line 24 to a port on the deactivator 14. This signal switches the deactivator 14 to its enabled condition in which it will deactivate a tag, and holds it in that condition for the duration of the signal. The duration of the signal is long enough to enable the article to be moved along the path designated P but too short to allow another article to be moved into range of the deactivator's field whilst bypassing the bar code reader 10.

In summary, each successful swipe across the bar code reader 10 enables the deactivator 14 for a brief period of time. Any effort by the cashier to move two articles past the deactivator 14 after having swiped only one of them over the bar code reader 10 is difficult and moreover can be detected on surveillance cameras.

Many bar code readers include a LED, usually green, which lights up



-7-

to give a visual indication of a successful swipe. The signal to this LED can be tapped to provide the signal which enables the deactivator 14. Some bar code readers have a port into which a remote speaker can be plugged so that the "beep" signal can be emitted at some remote point. The signal at this port can also be used  
5 for the purpose of enabling the deactivator 14. It will be understood from the above that the location at which the "successful swipe" signal is picked up is not important. It can be tapped-off at any suitable point in the bar code reader's circuitry, or picked-up acoustically. The method chosen depends on how it is most convenient to do it with the specific bar code reader that is being used.

10 The beep picked up by the pick-up 20 can be used, in conjunction with a microswitch 26 on a cash drawer 28, to detect fraudulent activities based on the cashier deliberately failing to shut the drawer 28 after a transaction. The unit 16 receives two signals. The one received from the microswitch 26 along the line 30 indicates if the drawer 28 has been closed or left open. The other signal is received  
15 along the line 18 and indicates that an article has been swiped over the bar code reader 10. This combination of a signal received along the line 30 indicating that the drawer 28 is open and a signal received along the line 18 indicating that an article has been swiped is used to establish an alarm condition. This is because failure to close the drawer 28 but to swipe articles, unless it happens infrequently and is  
20 genuinely by accident, has to be taken as an indication that possibly a fraudulent scheme is underway.

-8-

Turning now to Figure 3, the unit 16 is illustrated as is the acoustic pick-up 20, the line 24 and the deactivator 14. Between the pick-up 20 and the unit 16 there is a two stage amplifier 32 with gain control and rectification. The output of the amplifier 32 is fed to the unit 16 as a control pulse.

5                   A digital band pass control 34 is connected to the unit 16 and can be adjusted to tune the unit 16 to the frequency of the audio signal. A further control 36 is provided for adjusting the time for which a pulse remains on the line 24 after an input pulse is received at the unit 16 from the amplifier 32.

10                   In the event that the sales area is noisy, and difficulties are encountered in picking-up the audio signal, a signal can be picked up at 38 from a suitable location in the circuitry of the bar code reader. This signal may, on a successful read, go from low to high or high to low. This signal replaces the signal from the audio pick-up and enables the tag deactivator 14.

15                   The unit 16, which can be a programmable controller, can have a so-called jug plug socket 40 into which a programmed jug plug 42 can be inserted. This overrides the unit 16 and results in a pulse on line 24 which remains on line 24 until the jug plug 42 is removed.

                  A port 44 of the unit 16 has the line 30, and hence the micro switch 26 on the drawer 28, connected to it.

CLAIMS:

1. A checkout system for a retail store, the system including;  
a bar code reader which generates a signal each time there is a successful swipe across the reader, and which signal is used to cause an audible sound to be emitted; and  
an anti-theft tag deactivator which is switched into an enabled condition for a predetermined period each time said signal is generated.
2. A checkout system for a retail store, the system comprising;  
a bar code reader including means for generating a signal each time there is a successful swipe across the reader, the reader including means for emitting an audible sound each time said signal is generated;  
a control unit;  
means for feeding an operating signal to said control unit each time the successful swipe signal is generated; and  
an anti-theft tag deactivator connected to said control unit and having an enabled condition in which it deactivates a tag presented thereto and a disabled condition in which it does not deactivate a tag presented thereto, said unit generating an enable signal which switches said deactivator to its enabled condition for a predetermined period of time upon an operating signal being fed to the control unit.

-10-

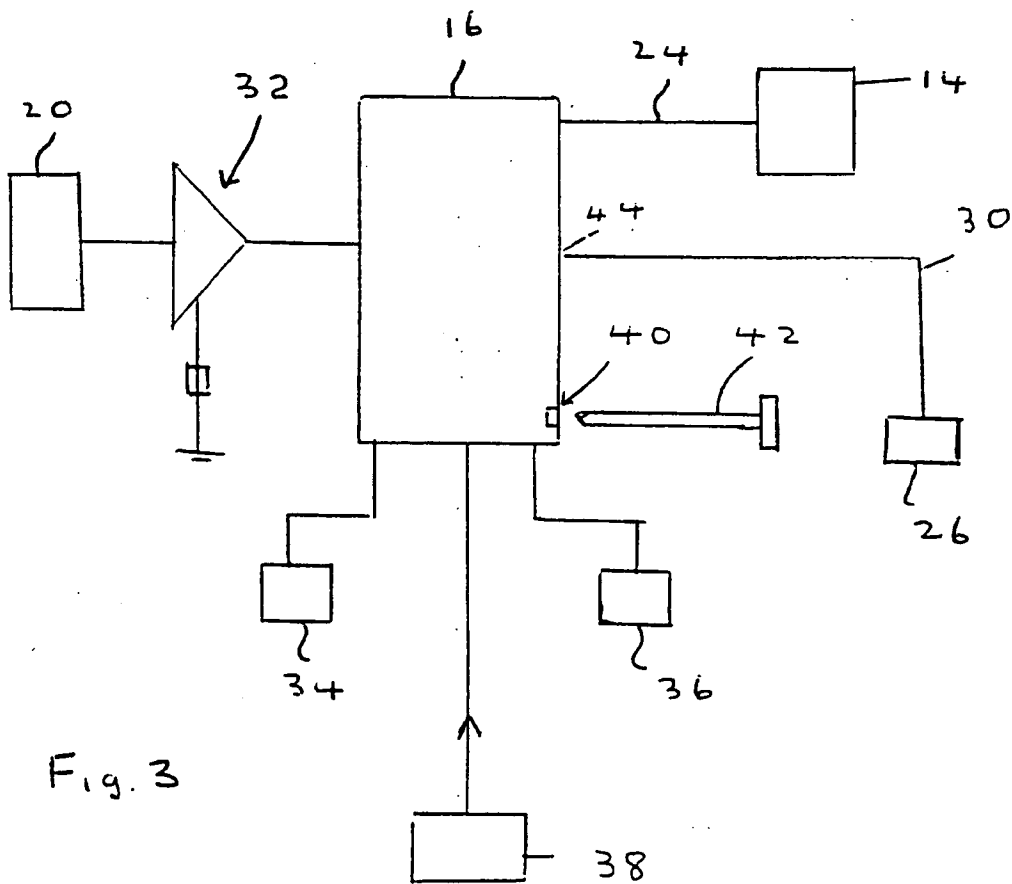
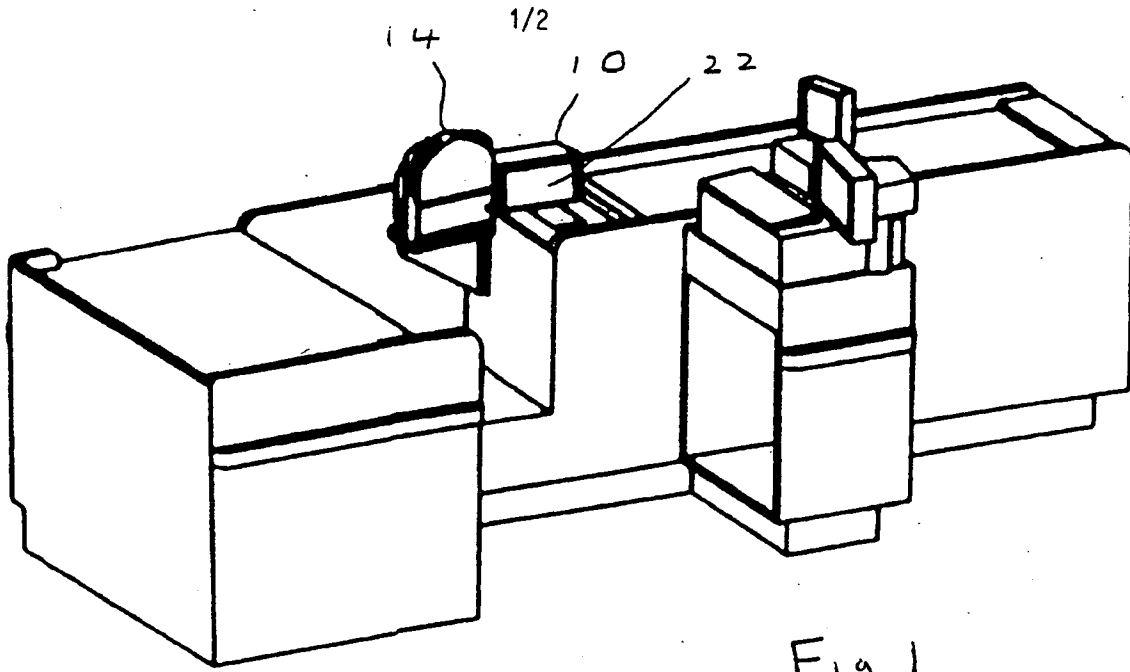
3. A checkout system as claimed in claim 2, wherein said means for feeding an operating signal to said control unit taps said operating signal off the bar code reader's electronic circuitry.

4. A checkout system as claimed in claim 2, wherein said means is an acoustic pick-up for detecting said sound and generating said operating signal.

5. A checkout system as claimed in claim 4, wherein said acoustic pick-up is a microphone attached to the bar code reader's housing.

6. A checkout system for a retail outlet, the system comprising a cash drawer and means for producing a first signal indicative of the cash drawer being fully closed, a bar code reader which generates a second signal each time that an article is "swiped" across it and the bar code is read successfully, and means responsive to said signals for establishing an alarm condition in the event that a second signal is received in the absence of a first signal.

7. A method of countering theft of an article from a retail store which article carries a tag that, unless deactivated, triggers an anti-theft alarm at a store exit, the method comprising swiping the article across a bar code reader to read a bar code carried by the article, using the signal generated by the bar code reader upon a successful swipe to enable a tag deactivator for a predetermined period of time, and disabling said deactivator at the end of said predetermined period of time.



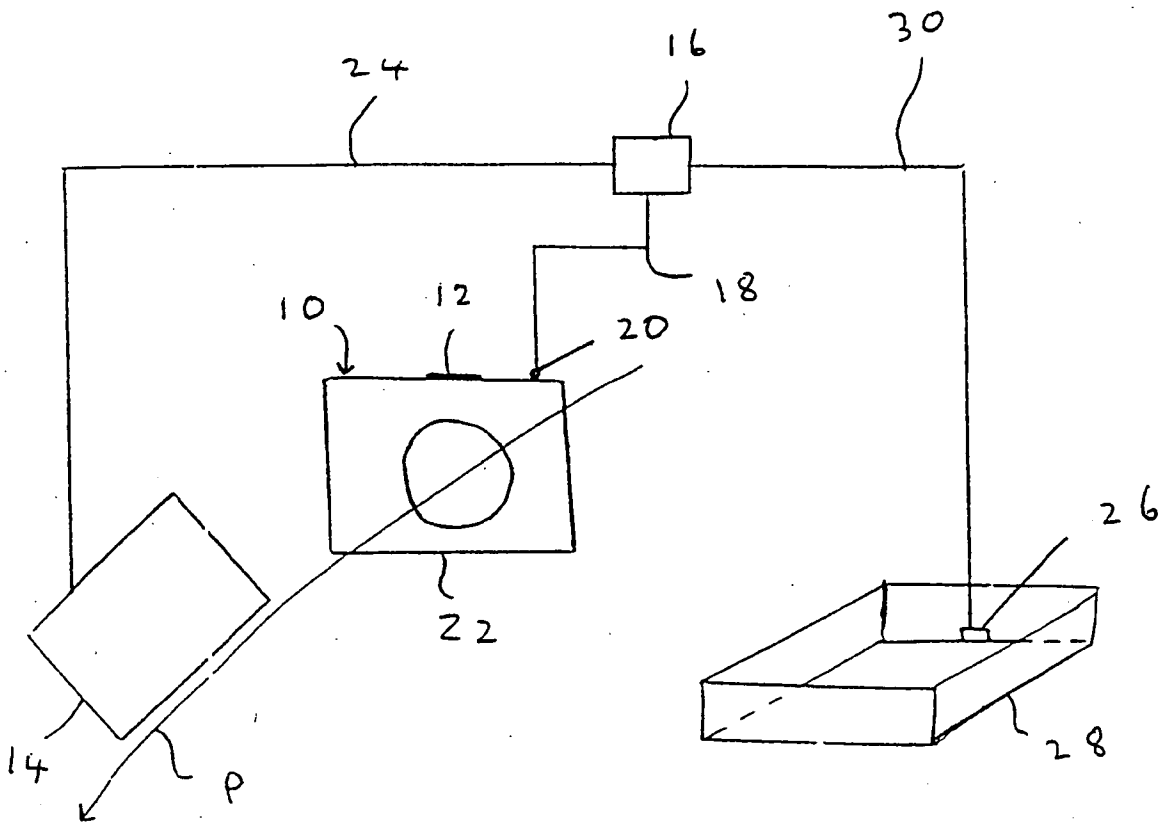


Fig. 2